

THE CYST NEMATODES IN FLORIDA

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The Genus Heterodera, which comprises the cyst nematodes, is a very serious problem in some of our states and certain foreign countries. Our nematologists are constantly on the lookout for two serious pests, the golden nematode of potatoes, Heterodera rostochiensis Wollenweber, 1923, and the soybean cyst, H. glycines Ichinohe, 1952. Fortunately, Florida crops are not affected by either of these pests at this time.

The golden nematode has been intercepted many times by the USDA at Florida ports of entry on goods from European countries.

H. schachtii Schmidt, 1871, a pest important to the western sugar beet industry, has been reported in Florida but does not presently pose a threat here.

The cyst nematode represents one of the nematode genera most resistant to chemical control, as the female transforms into a tough, brown, cystlike sac which protects eggs remaining within the body. Eggs and larvae may remain dormant within this cyst for years until favorable conditions are present for hatching. As many as 600 eggs may be produced by the female.

After the eggs hatch, the young larvae crawl about in the soil until a favorable host is found and then enter the root and begin feeding. In some cases, males are formed from the infective larvae, but females are most commonly formed. The females become swollen as eggs develop within, and after death they remain obese as tough, leathery cysts. The golden nematode life cycle may be completed in 38 to 48 days, whereas the soybean cyst nematode may produce eggs 24 days after the larvae enter the roots. Various conditions such as temperature, moisture, and root exudates affect the larval hatching, as a cyst may remain viable in the soil for 2 to 10 years or longer.

Florida does have cyst nematodes which are occasionally found in our routine soil samples, either as larvae, males, or the swollen female cysts. None of these described cyst species present a problem in Florida nurseries at the present. However, an undescribed species of Heterodera has been found infesting St. Augustine-grass, Stenotaphrum secundatum Kuntze, in Boynton Beach by Dr. A. A. DiEdwardo of the University of Florida Agricultural Experiment Station. This cyst has also been found in West Palm Beach, Miami, Hallandale, and West Hollywood. Tests by the Experiment Station indicate that this is a serious pest of St. Augustine-grass (Figs. 1 & 2). As a result, all St. Augustine-grass samples submitted to the Division of Plant Industry are examined for this new pest.

The most recently described species indigenous to Florida is H. cyperi Golden, Rau & G. S. Cobb, 1962, the nut-grass cyst nematode. This species has been collected at Fort Myers, Bradenton, Bunnell, Hastings, and Sanford. Yellow nut-grass, Cyperus esculentus L., is the only host we know this cyst nematode attacks. Cysts of this species have been recovered on nut-grass which was accidentally sampled with another intended specimen.



Fig. 1. Root systems of St. Augustine-grass, right infested with cyst nematode, left uninfested. Courtesy of A. A. DiEdwardo.



Fig. 2. Closeup of mature Heterodera n. sp. swollen white females on St. Augustine-grass. Courtesy of A. A. DiEdwardo.

Unlike other Heterodera sp., this cyst may develop under the epidermis of the root, although most of the adult females may rupture the root epidermis and be seen partially on the surface. The cyst of H. cyperi in Fig. 3 is one which has developed under the root epidermis. The epidermis has been sloughed off for photomicrographing, and the nematode head appears to be embedded in the stele of the root. Eggs nearing the last stages of development prior to hatching can be seen in the cyst. A portion of the gelatinous matrix can be seen on the posterior end. Many of the eggs are deposited in this matrix prior to hatching as seen in Fig. 4.



Fig. 3. Heterodera cyperi female cyst (after death) showing viable eggs. This cyst nematode infects nut-grass, Cyperus esculentus L.

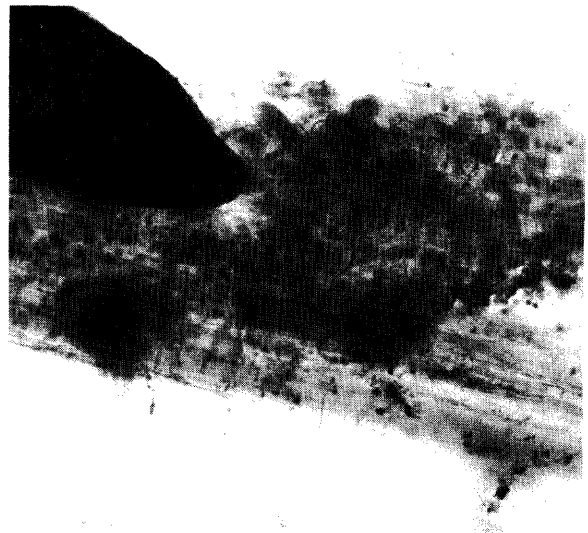


Fig. 4. A portion of cyst (dark) and gelatinous matrix containing eggs of Heterodera cyperi on nut-grass.

Other cyst nematodes reported found in Florida but for which information is lacking pertaining to hosts and range are H. catci Filipjev & Stekhoven, 1941, H. fici Kirjanova, 1954, H. punctata Thorne, 1928, H. trifolii Goffart, 1932, H. weissi Steiner, 1949, and H. schactii.

References

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